

IAP12 Rec'd PCT/PTO 01 MAY 2006

CLAIMS

1. (Amended) A failure sensing device of a vehicle control system including a control unit (100, 110, 120) generating a control target based on an operation request for controlling a driving state of a vehicle by manipulating a corresponding actuator using the generated control target, and a processing unit (200, 300) connected to said control unit (100, 110, 120) by a network, for generating and providing to said control unit (100, 110, 120) additional information to be used to modify said operation request or said control target, as necessary, at said control unit (100, 110, 120), wherein

said failure sensing device is provided to said control unit (100, 110, 120) with smaller control load, and includes

an output portion outputting information to said processing unit (200, 300) with greater control load,

a receiving portion receiving a response corresponding to said information from said processing unit (200, 300), and

a sensing portion sensing a failure in said processing unit (200, 300) based on said information and said response.

2. The failure sensing device according to claim 1, wherein

said information is input data for calculation at said processing unit (200, 300),

and

said receiving portion receives as a response a calculation result of said input data substituted into a predetermined calculation formula at said processing unit (200, 300).

3. The failure sensing device according to claim 1, wherein

said control unit (100, 110, 120) further includes a diagnosing portion diagnosing a failure in itself.

4. The failure sensing device according to claim 1, wherein
said control unit (100, 110, 120) is configured by multiplexed calculating units.

5 5. The failure sensing device according to claim 1, wherein
said control unit (100, 110, 120) further includes a determining portion
determining interruption of control in which additional information from said processing
unit (200, 300) is reflected, when a failure of said processing unit (200, 300) is sensed
by said sensing portion.

10 6. The failure sensing device according to claim 1, wherein
said control unit (100, 110, 120) is configured by a plurality of control units (100,
110, 120) controlling an operation of a vehicle, and
said control unit (100, 110, 120) further includes a sensing portion sensing a
failure in said processing unit (200, 300) based on a plurality of sensing results from
15 sensing portions included in said plurality of control units (100, 110, 120).

7. The failure sensing device according to claim 6, wherein
priorities as to failure sensing are assigned to said plurality of control units (100,
110, 120).

20 8. The failure sensing device according to claim 7, wherein
control units (100, 110, 120) with smaller control loads are given higher
priorities.

25 9. (Amended) A failure sensing device of a vehicle control system including a
control unit (100, 110, 120) generating a control target based on an operation request
for controlling a driving state of a vehicle by manipulating a corresponding actuator
using the generated control target, and a processing unit (200, 300) connected to said

control unit (100, 110, 120) by a network, for generating and providing to said control unit (100, 110, 120) additional information to be used to modify said operation request or said control target, as necessary, at said control unit (100, 110, 120), wherein

5 said failure sensing device is provided to said control unit (100, 110, 120) with smaller control load, and includes

 an output portion outputting information to said processing unit (200, 300) with greater control load,

 a receiving portion receiving a response corresponding to said information from said processing unit (200, 300), and

10 a sensing portion sensing a failure in said processing unit (200, 300) based on said information and said response, wherein

 units in said vehicle control system are hierarchically configured, and

 said control unit (100, 110, 120) is arranged hierarchically lower than said processing unit (200, 300).

15 10. (Amended) A failure sensing device of a vehicle control system including a control unit (100, 110, 120) generating a control target based on an operation request for controlling a driving state of a vehicle by manipulating a corresponding actuator using the generated control target, and a processing unit (200, 300) connected to said control unit (100, 110, 120) by a network, for generating and providing to said control unit (100, 110, 120) additional information to be used to modify said operation request or said control target, as necessary, at said control unit (100, 110, 120), wherein

 said failure sensing device is provided to said control unit (100, 110, 120) with smaller control load, and includes

25 outputting means for outputting information to said processing unit (200, 300) with greater control load,

 receiving means for receiving a response corresponding to said information from said processing unit (200, 300), and

sensing means for sensing a failure in said processing unit (200, 300) based on said information and said response.

11. The failure sensing device according to claim 10, wherein
5 said information is input data for calculation at said processing unit (200, 300),
and

said receiving means includes means for receiving as a response a calculation result of said input data substituted into a predetermined calculation formula at said processing unit (200, 300).

10 12. The failure sensing device according to claim 10, wherein
said control unit (100, 110, 120) further includes diagnosing means for
diagnosing a failure in itself.

15 13. The failure sensing device according to claim 10, wherein
said control unit (100, 110, 120) is configured by multiplexed calculating units.

14. The failure sensing device according to claim 10, wherein
said control unit (100, 110, 120) further includes means for determining
20 interruption of control in which additional information from said processing unit (200,
300) is reflected, when a failure of said processing unit (200, 300) is sensed by said
sensing means.

15. The failure sensing device according to claim 10, wherein
25 said control unit (100, 110, 120) is configured by a plurality of control units (100,
110, 120) controlling an operation of a vehicle, and
said control unit (100, 110, 120) further includes means for sensing a failure in
said processing unit (200, 300) based on a plurality of sensing results from sensing

means included in said plurality of control units (100, 110, 120).

16. The failure sensing device according to claim 15, wherein
priorities as to failure sensing are assigned to said plurality of control units (100,
5 110, 120).

17. The failure sensing device according to claim 16, wherein
control units (100, 110, 120) with smaller control loads are given higher
priorities.

18. (Amended) A failure sensing device of a vehicle control system including a
control unit (100, 110, 120) generating a control target based on an operation request
for controlling a driving state of a vehicle by manipulating a corresponding actuator
using the generated control target, and a processing unit (200, 300) connected to said
15 control unit (100, 110, 120) by a network, for generating and providing to said control
unit (100, 110, 120) additional information to be used to modify said operation request
or said control target, as necessary, at said control unit (100, 110, 120), wherein

said failure sensing device is provided to said control unit (100, 110, 120) with
smaller control load, and includes

20 outputting means for outputting information to said processing unit (200, 300)
with greater control load,

receiving means for receiving a response corresponding to said information from
said processing unit (200, 300), and

sensing means for sensing a failure in said processing unit (200, 300) based on
25 said information and said response, wherein

units in said vehicle control system are hierarchically configured, and
said control unit (100, 110, 120) is arranged hierarchically lower than said
processing unit (200, 300).